Weekly Report

2018.1119-2018.1125

1.This Week

Deep Learning Power Grid Project:

1.We finally choose the we-think most appropriate distance measure (ED) and the BIRCH clustering method (because it is the most fasted one and other methods needs days to compute). We sample the dataset and project 500 hundred samples . We find that:

- We can see multiple clusters (separated clearly) on the projection. These clusters always contains a small set of data samples (usually less than 10).
- There's no big clusters that contains more than 20 data samples.
- Very small clusters (containing only 1 or 2 samples) distributes between the 10-sample-clusters. So10-sample-clusters are only clear when the very small ones are removed. Now we're adding interactions on the projection to examine why these very small clusters are distributed like that.

Power flow Project

1.Design the logic, the functions and the interface of this project.

2.The progress of this project：

- all parts of the interface are finished with synthetic data.(so the topology is quiet disordered because the real grid won't have so much links and the project view cannot show any patterns)
- interactions within each view are finished. But interactions involve multiple views are not finished yet.
- the backend is not built because we haven't import real data.

3.Write the technical report of this project.

Working Hour: (except nap and eat time)
8-9 hours / week day
6 hours on Sunday
Total Working Hour this week: 49 hours.

Other
1.Interview undergraduate students that wants to participate power grid projects.

Paper Reading
1.Multi-Agent Bargaining Learning for Distributed Energy Hub Economic Dispatch
This paper proposes a multi-agent bargaining learning (MABL) method for the energy hub dispatch. It improves the classical Q-learning and the non-uniform mutation operator by achieving an effective coordination between the buyer agents and a seller agent, so that the total payoff of all the energy hubs can be maximized.

2.Deep Forest Reinforcement Learning for Preventive Strategy Considering Automatic Generation Control in Large-Scale Interconnected Power Systems
This paper adopts deep forest upon traditional reinforcement learning to improve the algorithm accuracy when dimension of the data increases. It combines deep forest with multiple subsidiary reinforcement learning. The deep forest component is applied to predict the next systemic state of a power system. The multiple subsidiary reinforcement learning component is applied to learn the features of the power system. This method is used as a preventive strategy for automatic generation control.

3.Ensemble learning for optimal active power control of distributed energy resources and thermostatically controlled loads in an islanded microgrid
This paper adopts a model-free ensemble learning method to solve the optimal active power control problem (a nonsmooth and nonlinear optimization with a quite short implementation period).It is composed of multiple sub-optimizers and a learning concentrator. Each sub-optimizer is used for providing the exploitation and exploration samples to the learning concentrator. The reinforcement learning based concentrator is mainly used for knowledge learning and knowledge transfer.

4.A Visual Analytics Framework for Spatiotemporal Trade Network Analysis

This paper suggests that changes and disruptions within trading networks (of multiple countries) can serve as indicators for increased risks of violence and armed conflicts. So it proposes a visual analytics method that extracts correlations and anomalies in multivariate spatiotemporal trade network. It analyzes predefined vulnerbilities of the network. One brighht point of this paper is that its case studies writes likes an interesting story.

2.Progress

Work	Deadline	Progress
Power grid paper with Deeping learning	12.15	1.explore the original data space.
SQC Paper	-	1.Delayed
Power Flow Project	December	1.Finish the interface and preliminary interactions.